This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A composition of matter for the active structure MAP-S wherein MAP is an organic molecule which is covalently bound to a substrate S, wherein S selected from the group consisting of metal, alloy, ceramic, natural polymer, synthetic polymer, bioabsorbable polymer, liquid polymer and combinations and blends thereof, and the organic structure MAP is selected from:

$(R)_{n+1}$-$(Z)_n$-X-

where n is selected from 1, 3, 7 or 15,

R and Z in each MAP structure are the same or a different moiety, each R is any length and contains any type and number of cell-binding ligands, any type and number of amino acids up to 2000 amino acids, anti-inflammatory structures anti-thrombogenic structures, growth factor structures, adhesion barrier structures and combinations thereof with the proviso that, the MAP has a active functional groups to covalently link the MAP structure to the surface of the substrate (S), located on group X, Z or R;

X is active or protected linking group selected from the group consisting of amine, amino acids of 1 to 5, (X1 to X5) which when present are the same or different, carboxylic acid, anhydride, hydroxyl, carbonyl succinimide (NHS) and siloxane;

Z is independently selected from the group consisting of lysine, polylysine, ornithine or any trifunctional organic structure;

R when present in each MAP structure comprise a total of up to about 1500 amino acids, anti-inflammatory agents, growth factor agents, adhesion barrier agents, anti-thrombogenic agents, growth factor agents, adhesion barrier agents or combinations thereof; and

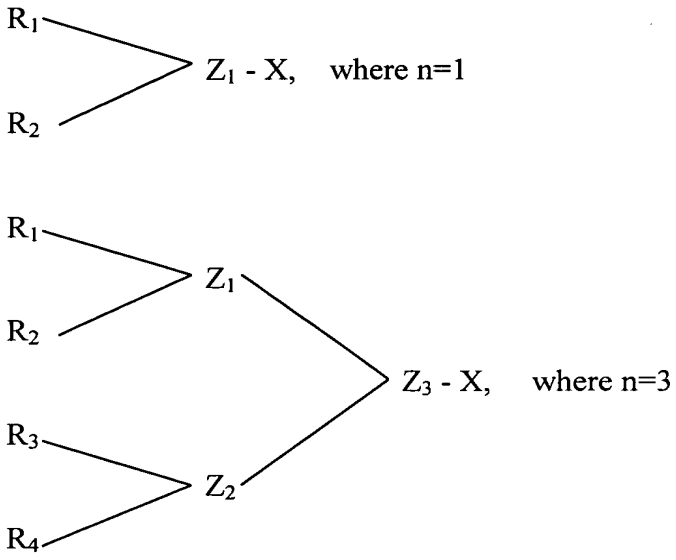
Z when present comprise a total of up to about 500 amino acids.

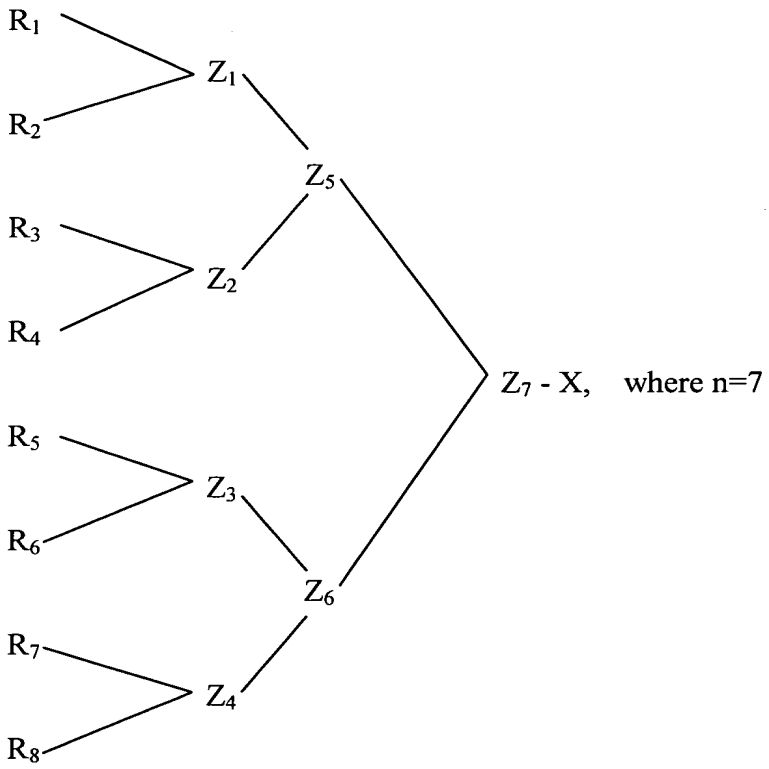
2. (Original) A composition of matter for the active structure MAP-S wherein MAP is an organic molecule which is covalently bound to a substrate S, wherein S selected from the

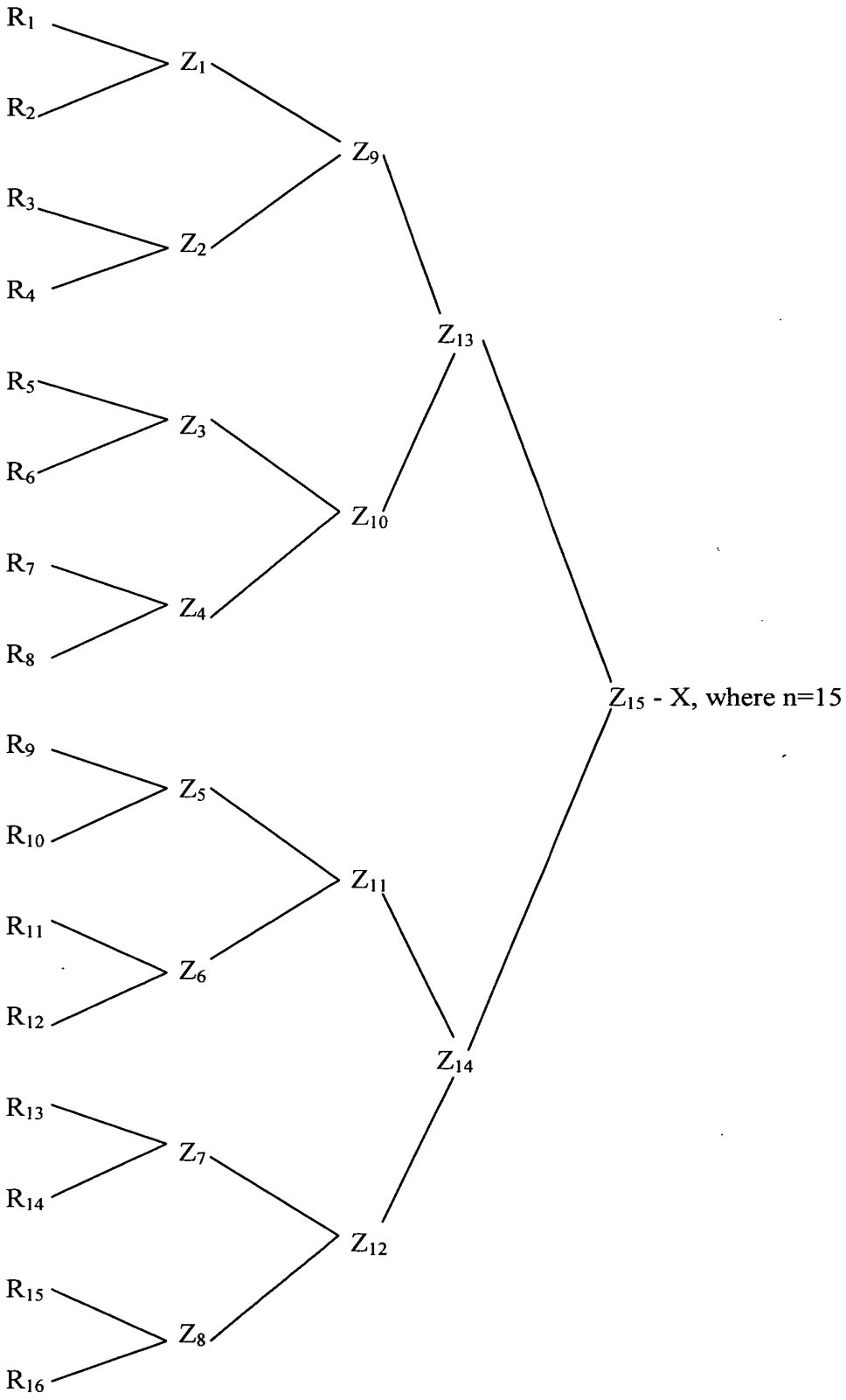
group consisting of metal, alloy, ceramic, natural polymer, synthetic polymer, bioabsorbable polymer, liquid polymer and combinations and blends thereof, and the organic structure MAP is selected from:

$(R)_{n+1}$-$(Z)_n$-X-

where n is selected from 1, 3, 7 or 15, producing the following structures:




R1
R2
Z1
R3
R4
Z2
Z5
R5
R6
Z3
R7
R8
Z4
Z6
Z7 - X, where n=7


R1
R2
Z1
R3
R4
Z2
Z9
R5
R6
Z3
R7
R8
Z4
Z10
Z13
Z15 - X, where n=15
R9
R10
Z5
R11
R12
Z6
Z11
Z14
R13
R14
Z7
R15
R16
Z8
Z12

R and Z in each MAP structure are the same or a different moiety, each R is any length and contains any type and number of cell-binding ligands and any type and number of amino acids up to 2000 amino acids, with the proviso that, the MAP has a active functional groups to covalently link the MAP structure to the surface of the substrate (S), located on group X, Z or R;

X is active or protected linking group selected from the group consisting of amine, linked amino acids 1 to 5 X_1, X_2, X_3, X_4 or X_5 which when present are the same or different, carboxylic acid, anhydride, hydroxyl, carbonyl succinimide (NHS) and siloxane;

Z is independently selected from the group consisting of lysine, polylysine, ornithine or any trifunctional organic structure;

R_1 to R_{16} when present in each MAP structure comprise a total of up to about 1500 amino acids, anti-inflammatory agents, anti-thrombogenic agents, growth factor agents, adhesion barrier agents or combinations thereof; and

Z_1 to Z_{15} when present comprise a total of up to about 500 amino acids.

3. (Original) The composition of matter of Claim 2 wherein R_1 to R_{16} when present are each independently selected from the group consisting of total of up to about 1500 amino acids, anti-flammatory agents, anti-thrombogenic agents and combinations thereof.

4. (Original) The composition of matter of Claim 2 wherein S is selected from the group consisting of hydroxyapatite, stainless steel, cobalt-chromium, molybdenum alloy, titanium, titanium alloy, polypropylene, polyethylene, polystyrene, polyether, polyamide/polyethylene copolymer, polychloroprene, polyester, polyvinyl chloride, polyolefin, polyphenolic, polyhydroxyacid, ABS epoxy, polytetrafluoroethylene, expanded polytetrafluoroethylene, polytetrafluoroethylene/polyethylene copolymer, fluorinated ethylene propylene, polyvinylidene, hexafluroropropylene, polyurethane, polysiloxane, polyisoprene, silicone, styrene butadiene, natural rubber, latex rubber, polyethyleneterephthalate, polycarbonate, polyamide, polyaramid, polyaryl ether ketone, polyacetal, polyphenylene oxide, polysulfone, polyethersulfone, regenerated cellulose, polyamino acids, polyarylsulfone, polyphenylene sulfide (PBT) poly(glycolide), HEMA and combinations thereof.

5. (Original) The composition of matter of Claim 2 wherein R_1 to R_{16} when present are independently selected from the group consisting of

GTPGPQGIAGQRGVV (SEQ ID NO: 1);

RGD (SEQ ID NO: 2);

REDV (SEQ ID NO: 3);

WQPPRARI (SEQ ID NO: 4);

YIGSR (SEQ ID NO: 5);

SIKVAV (SEQ ID NO: 6);

RYVVLPRPVCFEKGMNYTVR (SEQ ID NO: 7);

GEFYFDLRLKGDK (SEQ ID NO: 8);

GAG (SEQ ID NO: 9);

QGIAGQ (SEQ ID NO: 10);

KNEED (SEQ ID NO: 11);

PDSGR (SEQ ID NO: 12);

anti-inflammatory agents;

antithrombogenic agents;

growth factor agents; and

adhesion barrier agents.

6. (Original) The composition of matter of Claim 5 wherein S is selected from the group consisting of hydroxylapatite, stainless steel, cobalt-chromium, molybdenum alloy, titanium, titan alloy, polypropylene, polyethylene, polystyrene, polyether, polyamide/polyethylene copolymer, polychloroprene, polyester, polyvinyl chloride, polyolefin, polyphenolic, polyhydroxyacid, ABS epoxy, polytetrafluoroethylene, expanded polytetrafluoroethylene, polytetrafluoroethylene/polyethylene copolymer, fluorinated ethylene propylene, polyvinylidene, hexafluroropropylene, polyurethane, polysiloxane, polyisoprene, silicone, styrene butadiene, natural rubber, latex rubber, polyethyleneterephthalate, polycarbonate, polyamide, polyaramid, polyaryl ether ketone, polyacetal, polyphenylene oxide, polysulfone, polyethersulfone, regenerated cellulose, polyamino acids, polyarylsulfone, polyphenylene sulfide, polybutyl-tere-phthalate (PBT) poly(glycolide), HEMA and combinations thereof.

7. (Original) The composition of matter of Claim 2 wherein X_1 and X_2 when present and X_1 or X_2 and combinations thereof are each independently selected from the group consisting of lysine, polylysine, ornithine and alanine.

8. (Original) The composition of matter of Claim 2 wherein Z_1 to Z_{15} when presented is independently selected from the group consisting of lysine, ornithine and polylysine.

9. (Original) The composition of matter of Claim 7 wherein S is selected from the group consisting of hydroxylapatite, stainless steel, cobalt-chromium, molybdenum alloy, titanium, titan alloy, polypropylene, polyethylene, polystyrene, polyether, polyamide/polyethylene copolymer, polychloroprene, polyester, polyvinyl chloride, polyolefin, polyphenolic, polyhydroxyacid, ABS epoxy, polytetrafluoroethylene, expanded polytetrafluoroethylene, polytetrafluoroethylene/polyethylene copolymer, fluorinated ethylene propylene, polyvinylidene, hexafluroropropylene, polyurethane, polysiloxane, polyisoprene, silicone, styrene butadiene, natural rubber, latex rubber, polyethyleneterephthalate, polycarbonate, polyamide, polyaramid, polyaryl ether ketone, polyacetal, polyphenylene oxide, polysulfone, polyethersulfone, regenerated cellulose, polyamino acids, polyarylsulfone, polyphenylene sulfide (PBT) poly(glycolide), HEMA and combinations thereof.

10. (Original) The composition of matter of Claim 2 wherein Z_1 to Z_{15} is lysine.

11. (Original) The composition of matter of Claim 2 wherein MAP is MAP4 and R_1 to R_4 are each independently selected of from linear peptides having about 50 amino acids or less.

12. (Original) The composition of matter of Claim 2 wherein MAP is MAP 8 and R_1 to R_8 are each independently selected from linear peptides having 50 amino acids or less.

13. (Original) The composition of matter of Claim 2 wherein MAP is MAP16 and R_1 to R_{16} are each independently selected from linear peptides having about 50 amino acids or less.

14. (Original) The composition of Claim 2 wherein R_1 to R_{16} are each an anti-inflammatory agent which is independently selected from aspirin, ibuprofen, naproxen, or COX-2; or combinations thereof.

15. (Original) The composition of matter of Claim 2 wherein R_1 to R_{16} when present are each anti-thrombogenic agents independently selected the group consisting of from heparin, coumarin, hirudin, hirudin analogs and combinations thereof.

16. (Original) The composition of matter of Claim 2 wherein R_1 to R_{16} when present are selected from growth factors.

17. (Original) The composition of matter of Claim 2 wherein R_1 to R_{16} when present are selected from adhesion barrier agents.

18. (Original) The composition of matter of Claim 2 wherein

S is selected from the group consisting of polytetrafluoroethylene (PTFE) and hydroxylapatite;

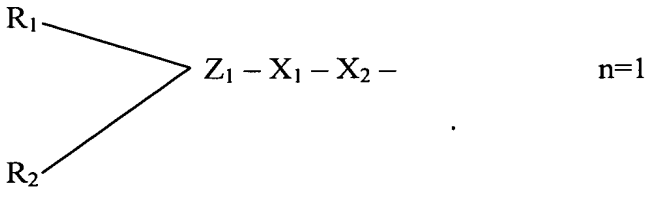
X_1 and X_2 are selected from the group consisting of carboxyl and amino acid;

Z_1 to Z_{15} are lysine; and

R_1 to R_{16} when present are selected from the group consisting of -Gly-Thr-Pro-Gly-Pro-Gln-Gly-Gln-Arg-Gly-Val-Val and RGD.

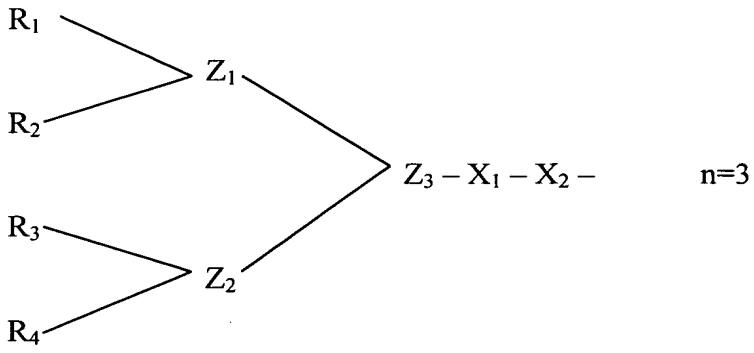
19. (Original) The composition of matter of Claim 2 wherein:

MAP is MAP2 of the structure:



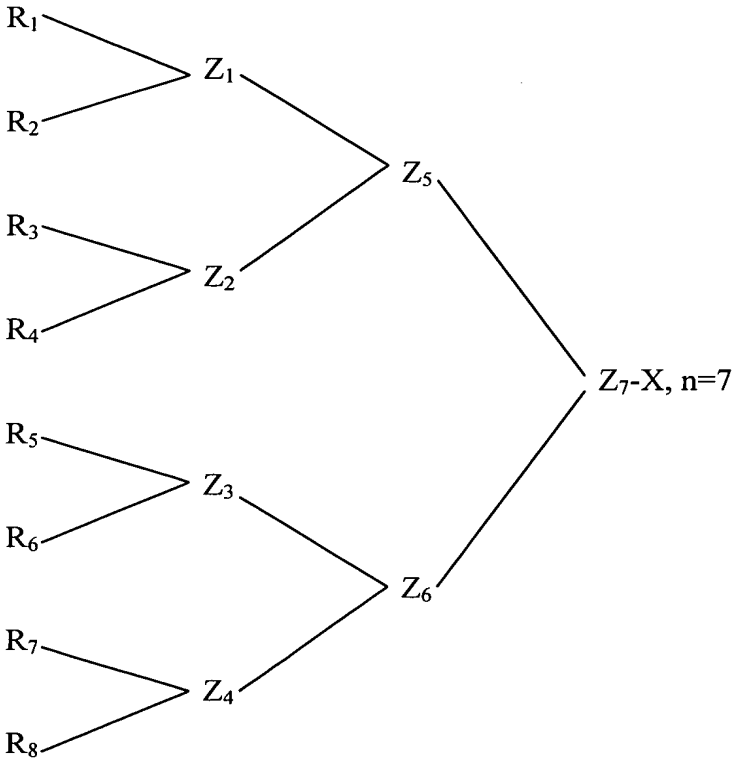
Z is lysine and R_1 and R_2 are each -Gly-Thr-Pro-Gly-Pro-Gln-Gly-Gln-Arg-Gly-Val-Val or RGD;

MAP is MAP4 of the structure:



Z_1, Z_2 and Z_3 are lysine and R^1, R^2, R^3 and R^4 are each -Gly-Thr-Pro-Gly-Pro-Gln-Gly-Gln-Arg-Gly-Val-Val or RGD; or

MAP is MAP8 of the structure:



Z_1 to Z_7 are lysine and R_1 to R_8 are each selected from -Gly-Thr-Pro-Gly-Pro-Gln-Gly-Gln-Arg-Gly-Val-Val or RGD; and X is $-X_1-$ or $-X_1-X_2-$ selected from lysine, ornithine or alanine.

20. (Original) A pharmaceutical composition which comprises:

a pharmaceutically acceptable amount of MAP of Claim 1 in combination with a pharmaceutically acceptable carrier.

21. (Original) A pharmaceutical composition which comprises a pharmaceutically acceptable amount of MA2, MAP 4 or MAP 8 of Claim 2 with a pharmaceutically acceptable carrier.

22. (Original) An implant comprising: a matrix formed of a multiple arm peptide-substrate (MAP-S) formed of a biomaterials coated substrate S and a multiple MAP peptide of Claim 1 combined by covalent bonding to the substrate, wherein the MAP peptide has terminal ligands which have enhanced properties for cell adhesion, migration, cell differentiation, cell proliferation, anti-inflammation, anti-thrombogenesis, cell growth, adhesion barrier and combinations thereof.

23. (Original) An implant comprising: a matrix formed of a multiple arm peptide-substrate (MAP-S) formed of a biomaterials coated substrate S and a multiple MAP peptide carried by covalent bonding to the substrate, wherein the MAP peptide has terminal ligands which have enhanced properties for cell adhesion, migration, differentiation, proliferation, anti-inflammation, anti-thrombogenesis, cell growth, adhesion barrier and combinations thereof,

wherein MAP-S has the MAP structure of Claim 2.

24. (Original) An implant comprising: a matrix formed of a multiple arm peptide-substrate (MAP-S) formed of a biomaterials coated substrate S and a multiple MAP peptide carried by covalent bonding to the substrate, wherein the MAP peptide has terminal ligands which have enhanced properties for cell adhesion, migration, differentiation, proliferation,

anti-inflammation, anti-thrombogenesis, cell growth, adhesion barrier and combinations thereof,

wherein MAP-S has the MAP structure of Claim 7.

25. (Original) The implant of Claim 22 wherein the peptide MAP has a peptide sequence selected from the group consisting of MAP ID NO: 13 - MAP ID NO: 48 inclusive.

26. (Original) The implant of Claim 25 wherein the substrate is selected from polymer materials selected from hydrocarbons including polypropylene, polyethylene, polystyrene, polyether, polyamide/polyethylene copolymer, polychloroprene, polyester, polyvinyl chloride, polyolefin, polyphenolic, polyhydroxyacid, ABS epoxy, and corresponding copolymers and blends;

fluorocarbons-including polytetrafluoroethylene, expanded polytetrafluoroethylene, polytetrafluoroethylene/polyethylene copolymer, fluorinated ethylene propylene, polyvinylidene, hexafluroropropylene corresponding copolymers and blends; elastomers including polyurethane, polysiloxane, polyisoprene, silicone, styrene butadiene, natural rubber, latex rubber, and corresponding copolymers and blends; engineering thermoplastics including polyethyleneterephthalate, polycarbonate, polyamide, polyaramid, polyaryl ether ketone, polyacetal, polyphenylene oxide, polysulfone, polyethersulfone, regenerated cellulose, polyamino acids, polyarylsulfone, polyphenylene sulfide, PBT, poly(glycolide), HEMA and the corresponding copolymers and blends; and

metallic materials selected from stainless steel, cobalt-chromium-molybdenum alloy, pure titanium, and titanium alloys.

27. (Original) The implant of Claim 26 wherein:

the peptide MAP is selected from a MAP 4 or MAP 8.

28. (Original) The implant of Claim 27 wherein:

R_1 to R_8 when present are selected from GTPGPQGIAGQRGVV (SEQ ID NO: 1) or RGD (SEQ ID NO: 2) and Z_1 to Z_7 are lysine and X_1 and X_2 are selected from ß-ala-COOH, ß-ala-$CONH_2$, lys, or lys (NH_2).

29. (Original) The implant of Claim 28 wherein S is selected from e-PTFE, PTFE, polysulfone, polyurethane, silicone, titanium or titanium alloy.